



LASIK Complications

LASIK

INTRAOPERATIVE COMPLICATIONS

POST OPERATIVE COMPLICATIONS

REFRACTIVE COMPLICATIONS



INTRAOPERATIVE Complications of LASIK

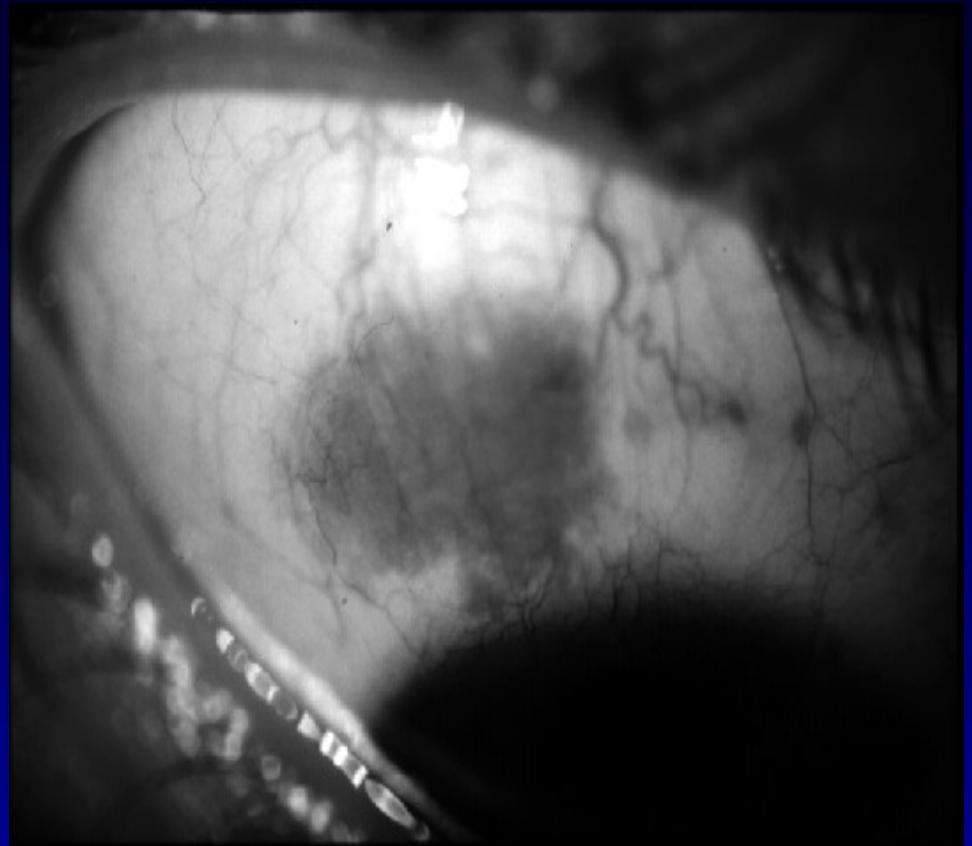
MOST ARE MICROKERATOME RELATED

- Excellent Bimanual Surgeon Dexterity
- Well Trained Assistants
- Technologically Complex
- Cleaning and Assembly
Critical for all
microkeratomes



Subconjunctival Hemorrhage

- Expected
- Result of Suction Ring
- Resolves 1-6 Weeks
- Cosmesis only problem
- Prepare patient



INTRAOPERATIVE Complications of LASIK

CORNEAL PERFORATION

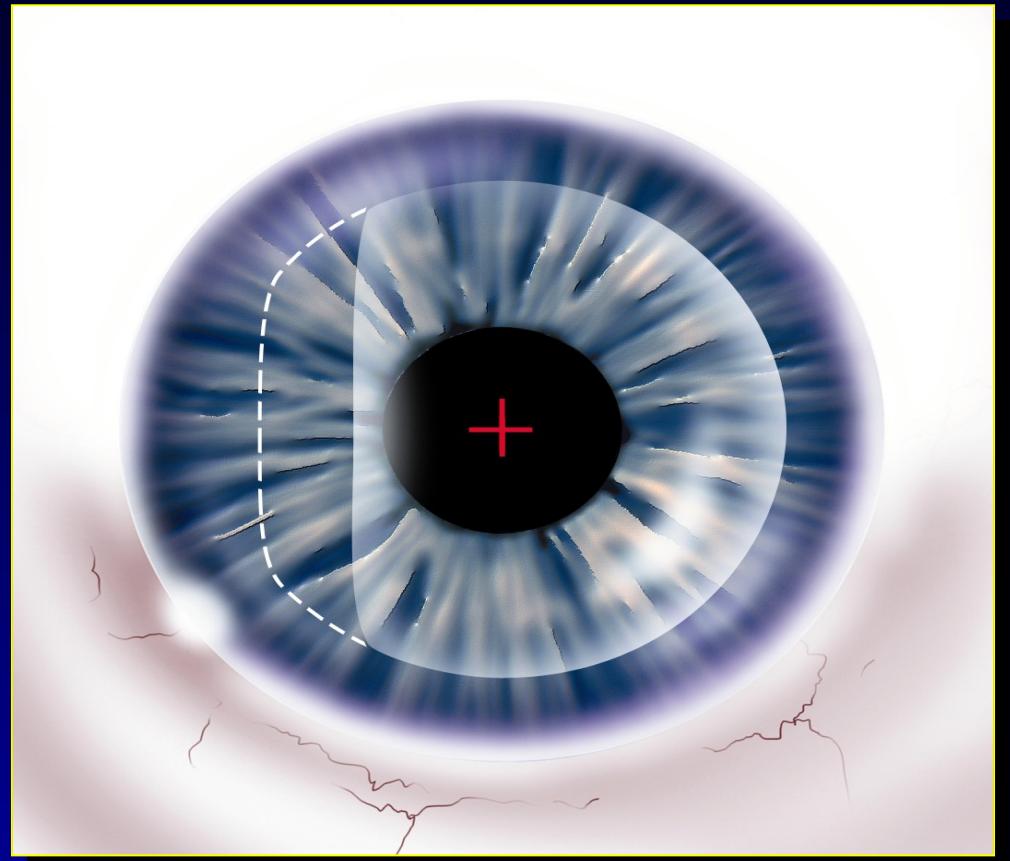
- Most Catastrophic of Complications
- Totally Avoidable
 - Position 160 Micron Plate Correctly
 - Any Plate Better than No Plate
 - Use newer Microkeratome (SKBM,
Hansatome, Amadeus)
- Anterior Segment Reconstruction
Required, Repair of: Lens, Iris, Vitreous,
Cornea

INTRAOPERATIVE Complications of LASIK KERATECTOMY RELATED

- Incomplete Cut
 - Mechanical Obstruction (Speculum, Drape, Lids) Less Problem with SKBM
 - Power Failure or Weak Motor
 - Surgeon Error with Foot Pedal
- Tx: Replace Flap, ReCut 3-4 Months

Incomplete Flap

- Incomplete lamellar cut due to premature release of the pedal or mechanical obstruction



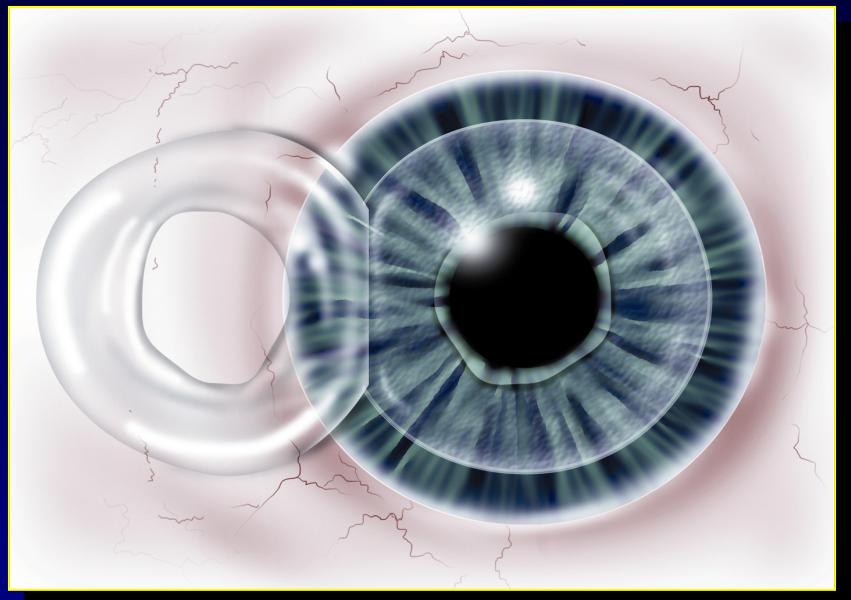
INTRAOPERATIVE Complications of LASIK

KERATECTOMY RELATED

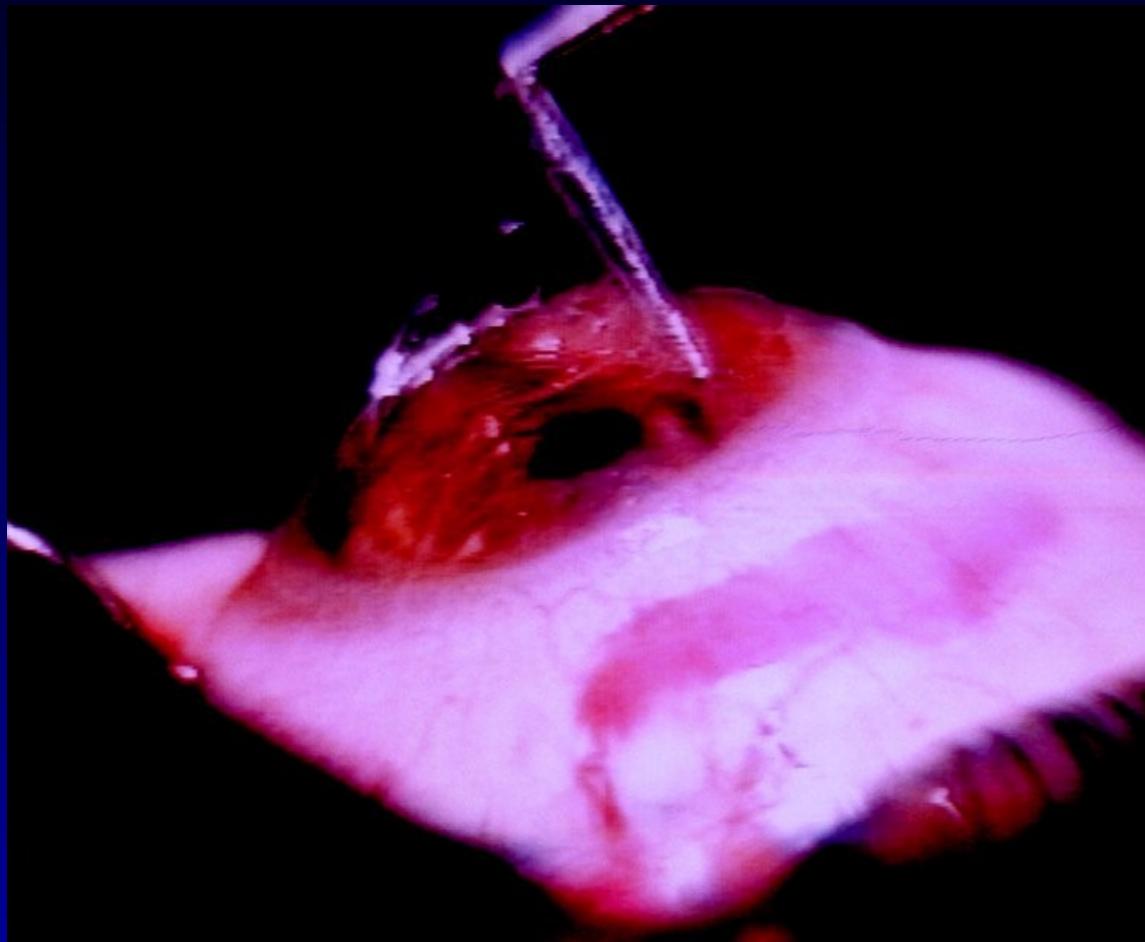
- Irregular Cut from LOSS of SUCTION
 - Poor Suction Pump, Blocked orifice(s) of Suction Ring
 - Crimped / Defective tubing
 - Chemosis / Redundant Conjunctiva
 - Patient Squeezes
 - Surgeon Error with Suction Foot Pedal
- Tx: Replace Flap, ReCut 3-4 Months

Buttonhole Flap

- Buttonhole flap due to poor suction.



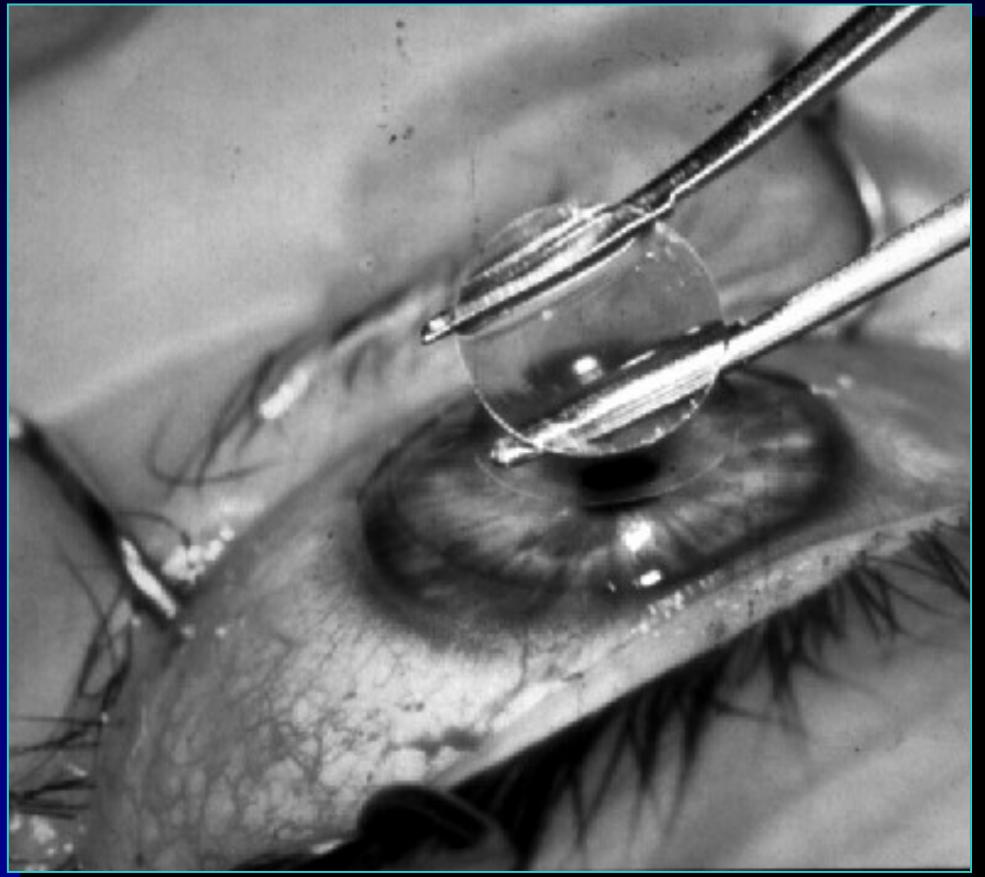
Thin Flap



INTRAOPERATIVE Complications of LASIK

FREE CAP

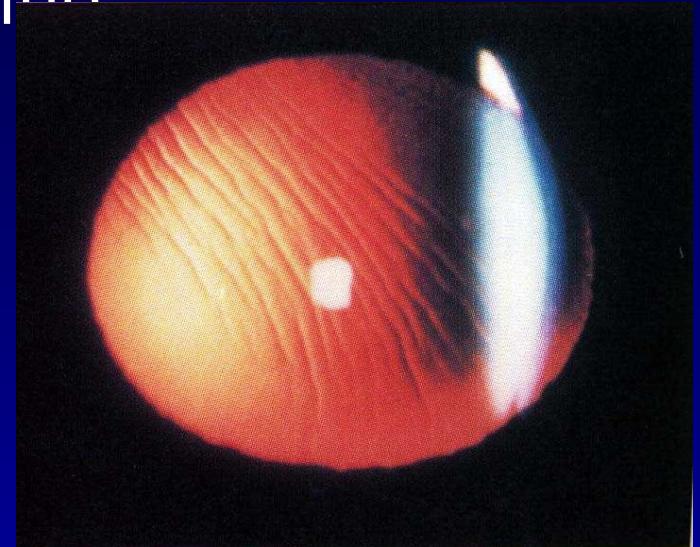
- Nuisance, not Complication Preventable with SKBM
- Flat Average K Reading: < 42.00 D Beware
- Anti Desiccation Chamber Prepared
- Good Corneal Mark - Pararadial Line
- Check Stop Mechanism
- Remark Cap in Microkeratome if Occurs



INTRAOPERATIVE Complications of LASIK

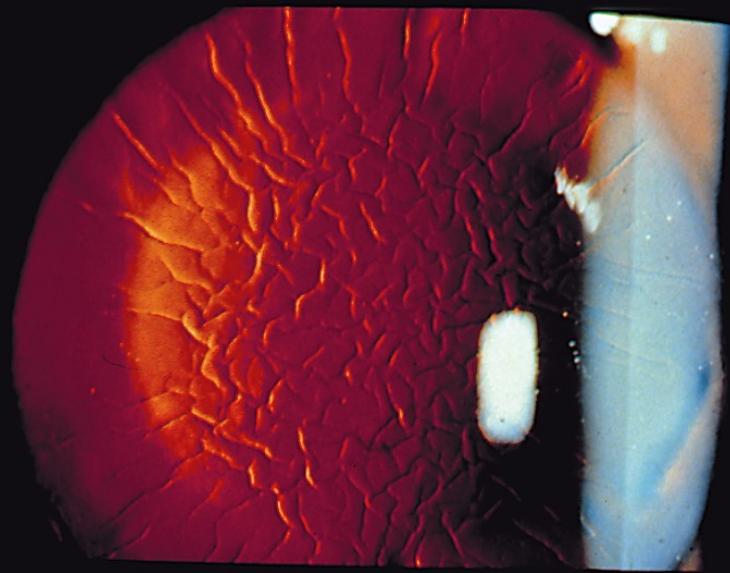
FLAP RELATED PROBLEMS

- Reflect and allow Flap to unfold during Ablation
- Dry Flap Adhered to Suction Ring
- Striae or Folds in Flap
 - Avoidance
 - › Stroke Flap into Place
 - › Moist Merocel Sponge
 - › Firm Strokes
 - › Look for 'Matte Finish'



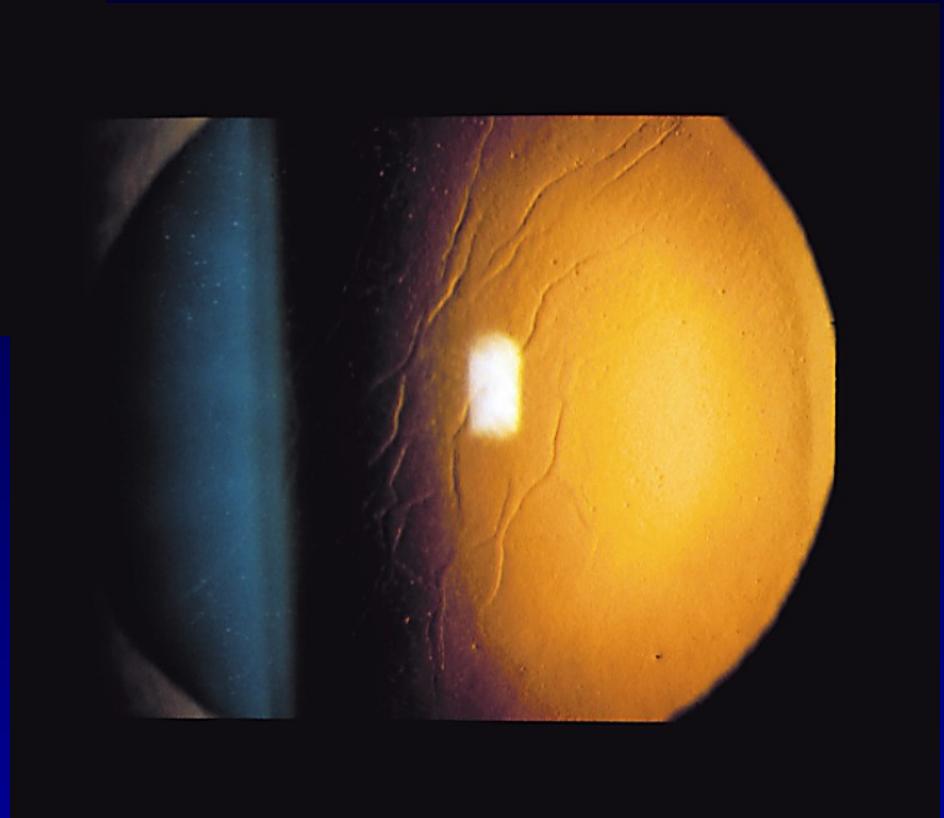
Striae





Wrinkled Flap

*Vertical oblique folds in
a superior hinged flap*



INTRAOPERATIVE Complications of LASIK

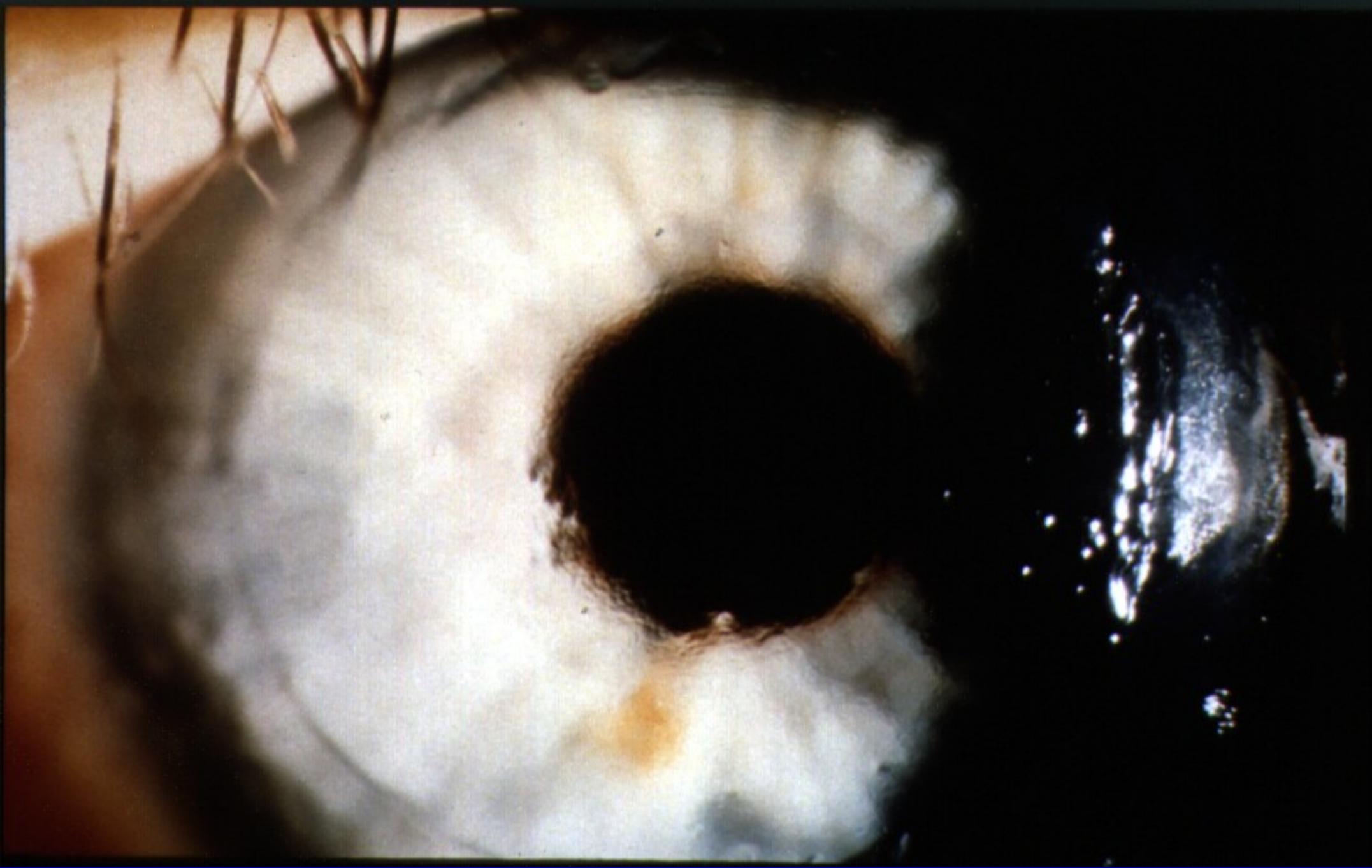
FLAP RELATED PROBLEMS

- MANAGEMENT
 - Lift flap
 - Clean bed and stromal flap surface of cells
 - Refloat / consider hydration with hypotonic saline
 - Aggressive distension/smoothing
Wet/Dry Sponge, Spatula/Forceps

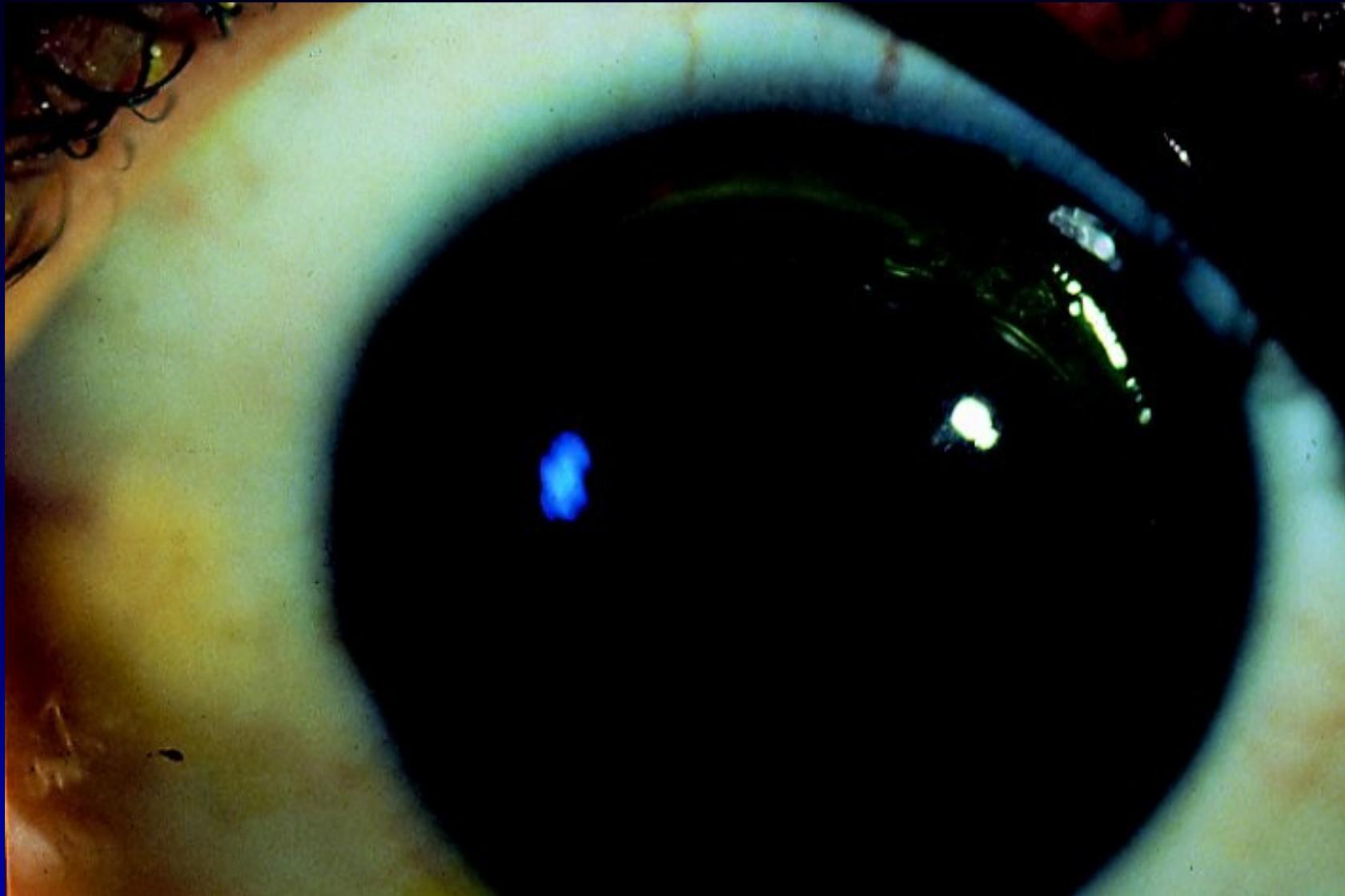
POSTOPERATIVE Complications of LASIK

LOOSE/DISPLACED FLAP

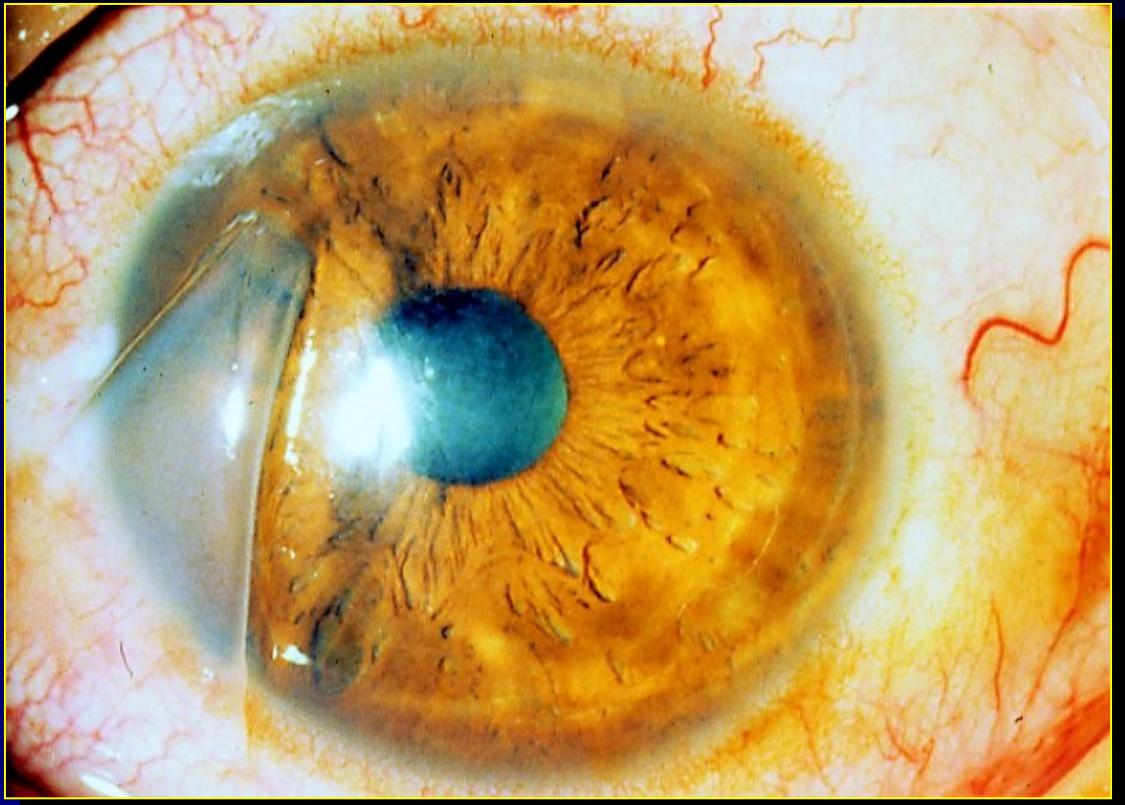
- Patient Call with Symptoms of:
 - Postop Discomfort/Pain after a few hours
 - Tearing, Poor Vision
- See Immediately (Suspect Loose Flap as LASIK should be relatively pain free)
 - Fluorescein Stain
 - Clean Interface
 - Refloat and Realign Flap



Displacement of nasal hinge flap



- Displacement and complete eversion of a nasal hinge flap



POSTOPERATIVE Complications of LASIK

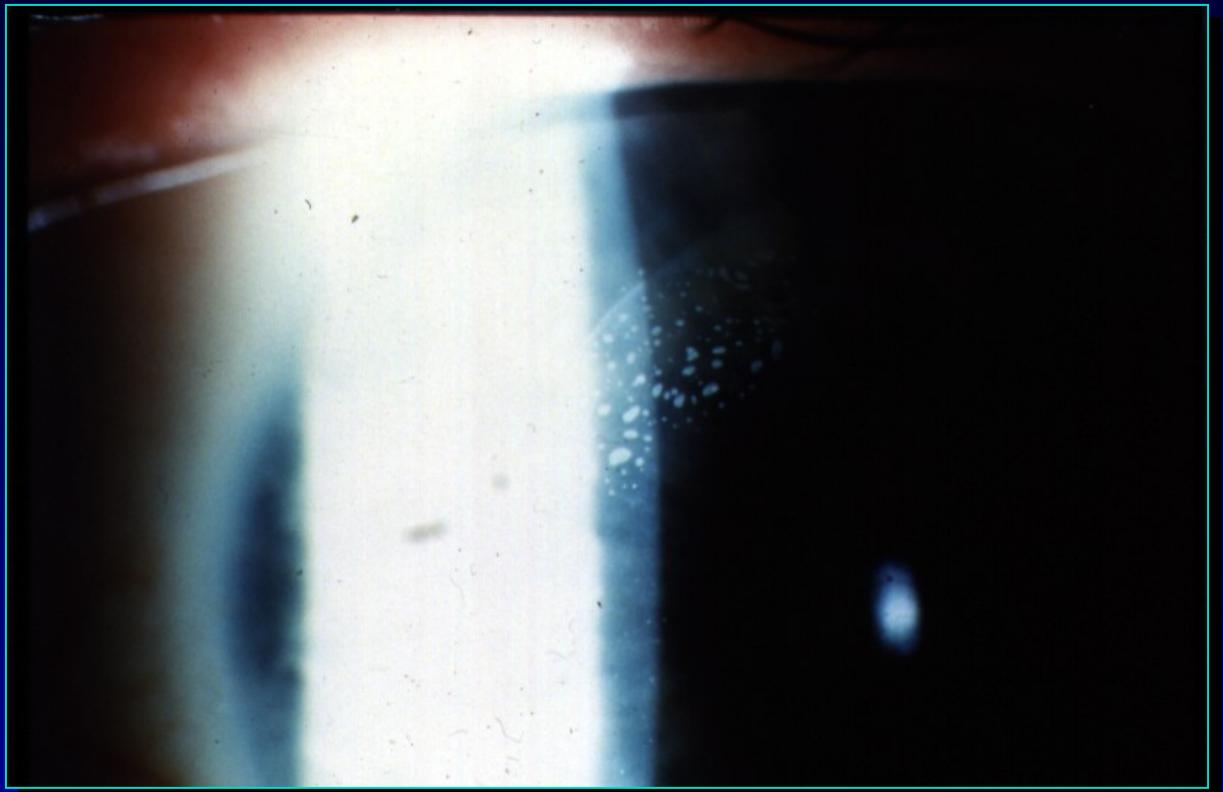
TOTALLY DETACHED CAP

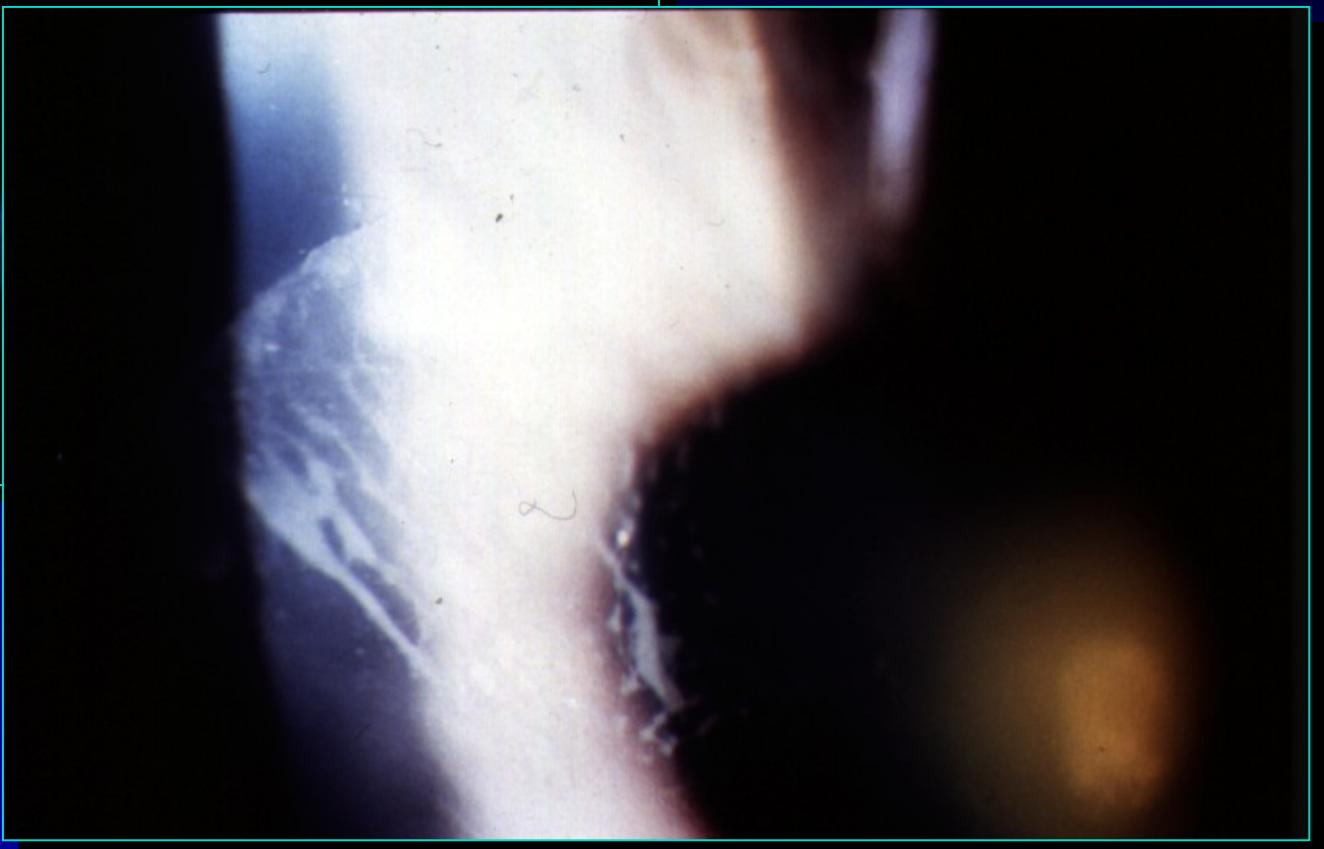
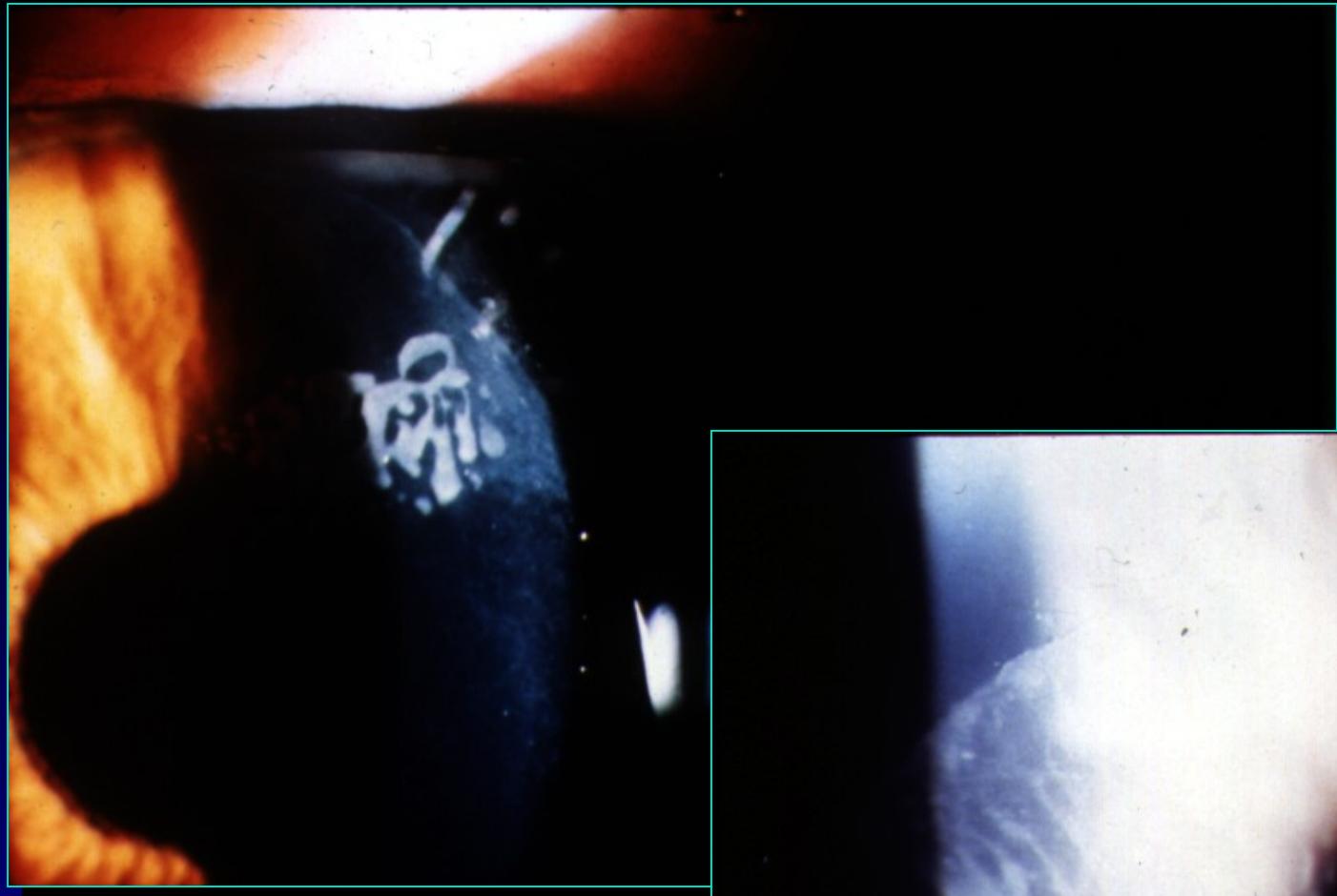
- Lost Cap
 - Allow Reepithelialization
 - Bandage Contact Lens
 - May be Capless PRK
- Cap Retrieved
 - Clean Vigorously
 - Replace as Correctly as possible
 - 8 Bite Anti Torque or Compression ('Bra') Suture

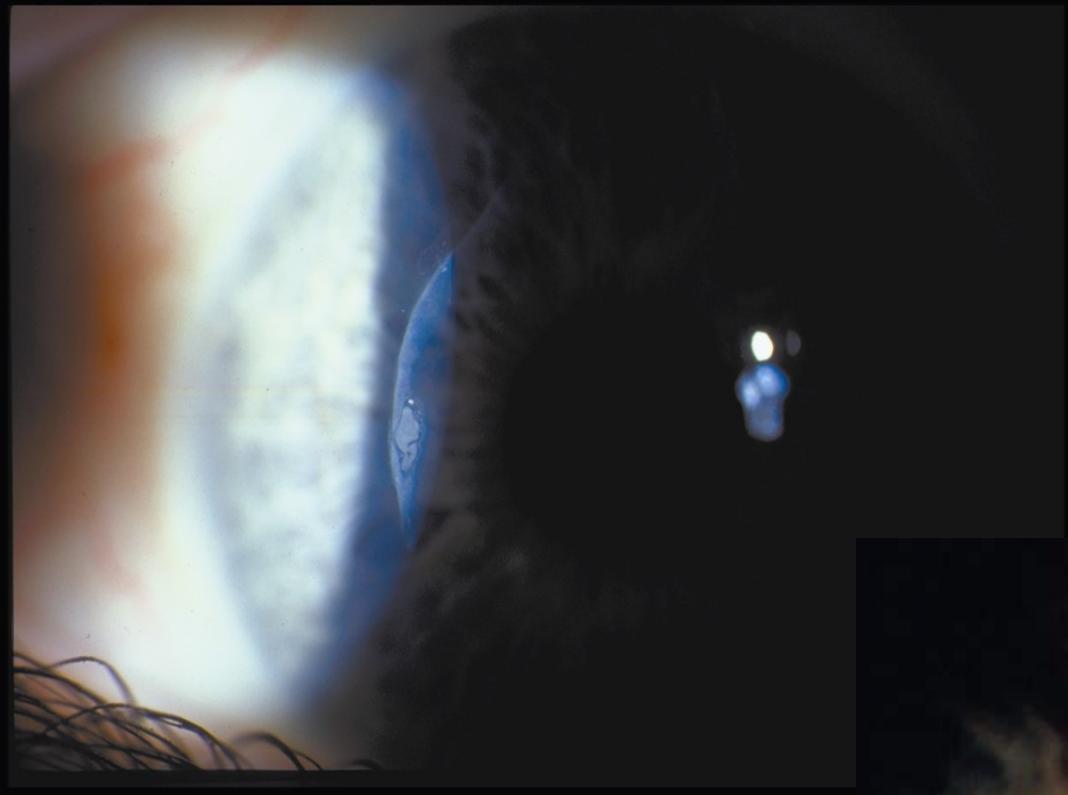
POSTOPERATIVE Complications of LASIK

EPIHELIAL INGROWTH

- Minimal → Observe
- Advancing → Lift & Clean Both Surfaces
- Corneal Melt ☺ Lift & Clean Vigorously
 - Monitor Epithelial Closure
 - Bandage Lens







*Epithelial ingrowth at
the flap edge*

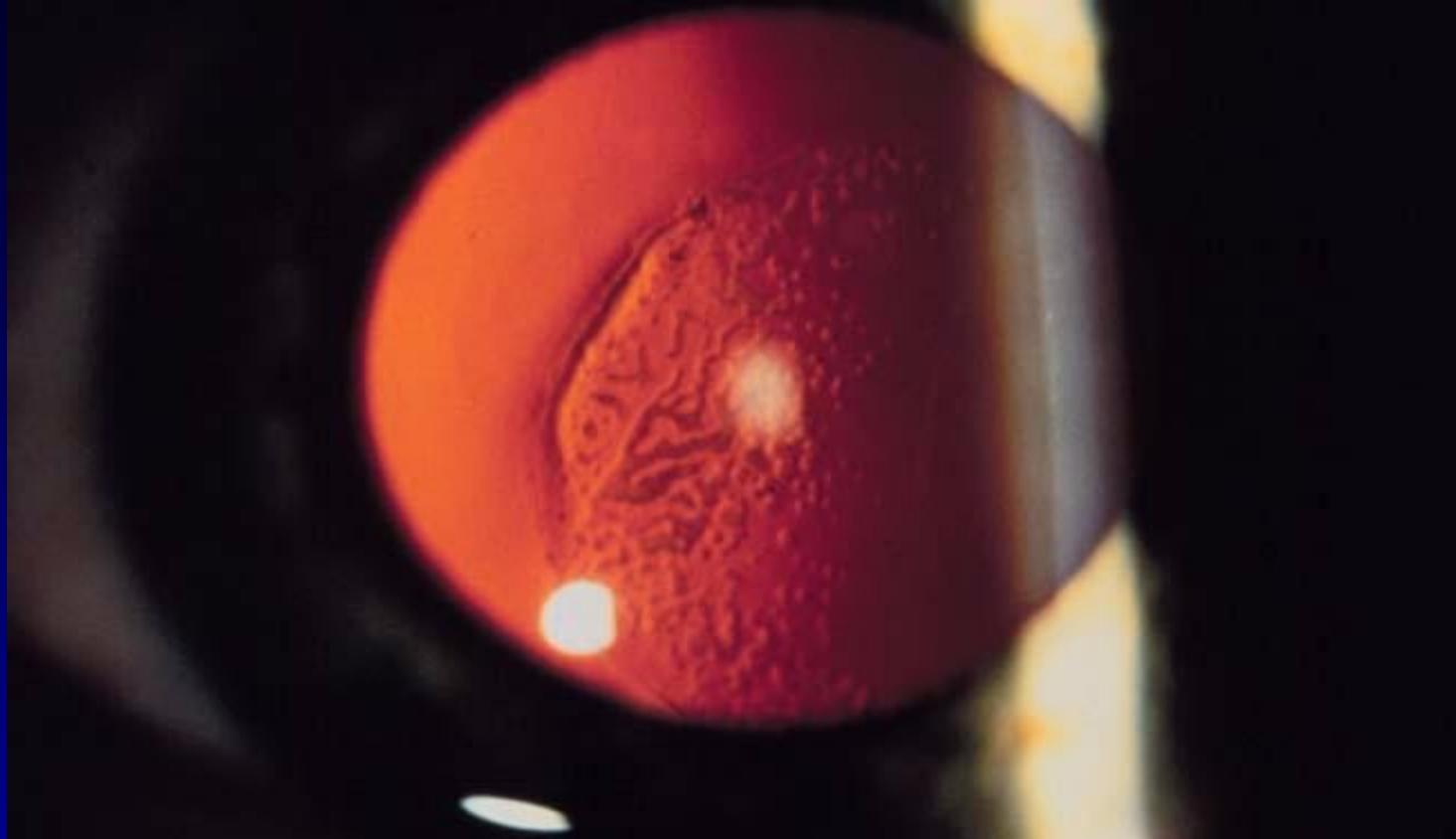
*Marked inferior
epithelial ingrowth:
Note cystic component*



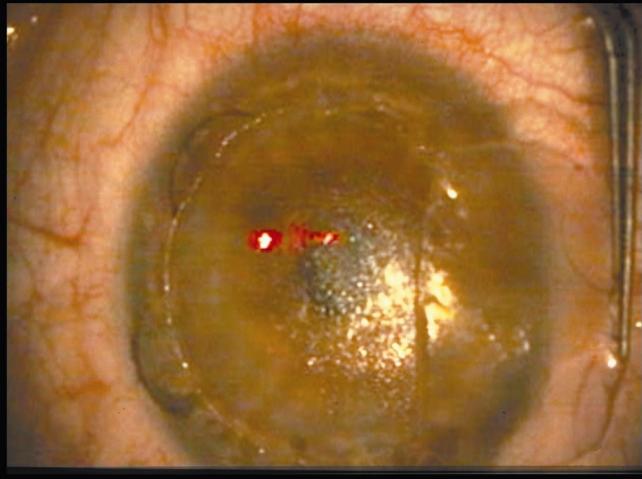
*Central
Cystic
Epithelial
Ingrowth*



*Retroillumination
reveals the extent
of ingrowth*

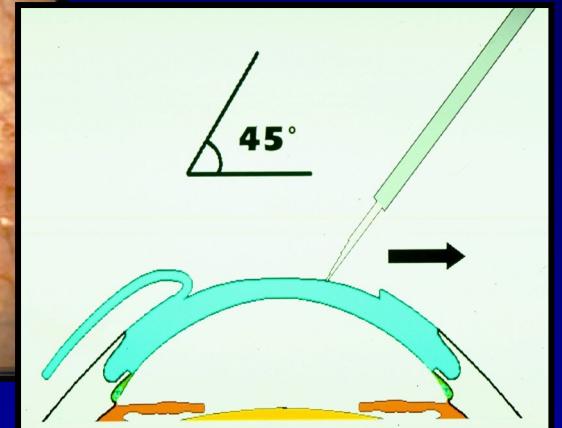
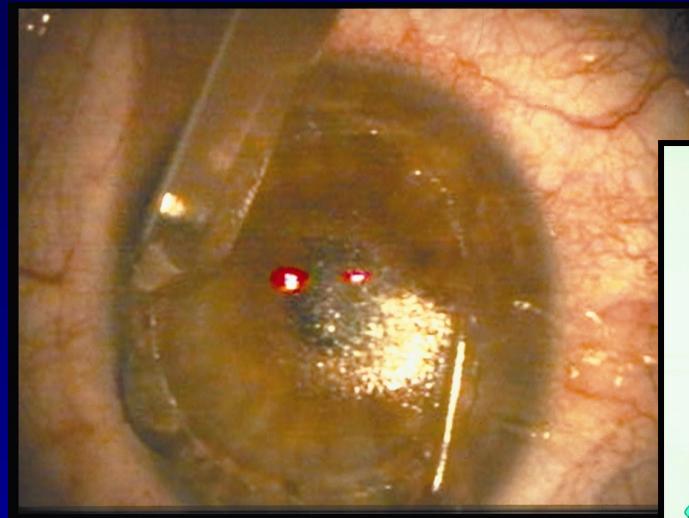


Removal of Epithelial Ingrowth

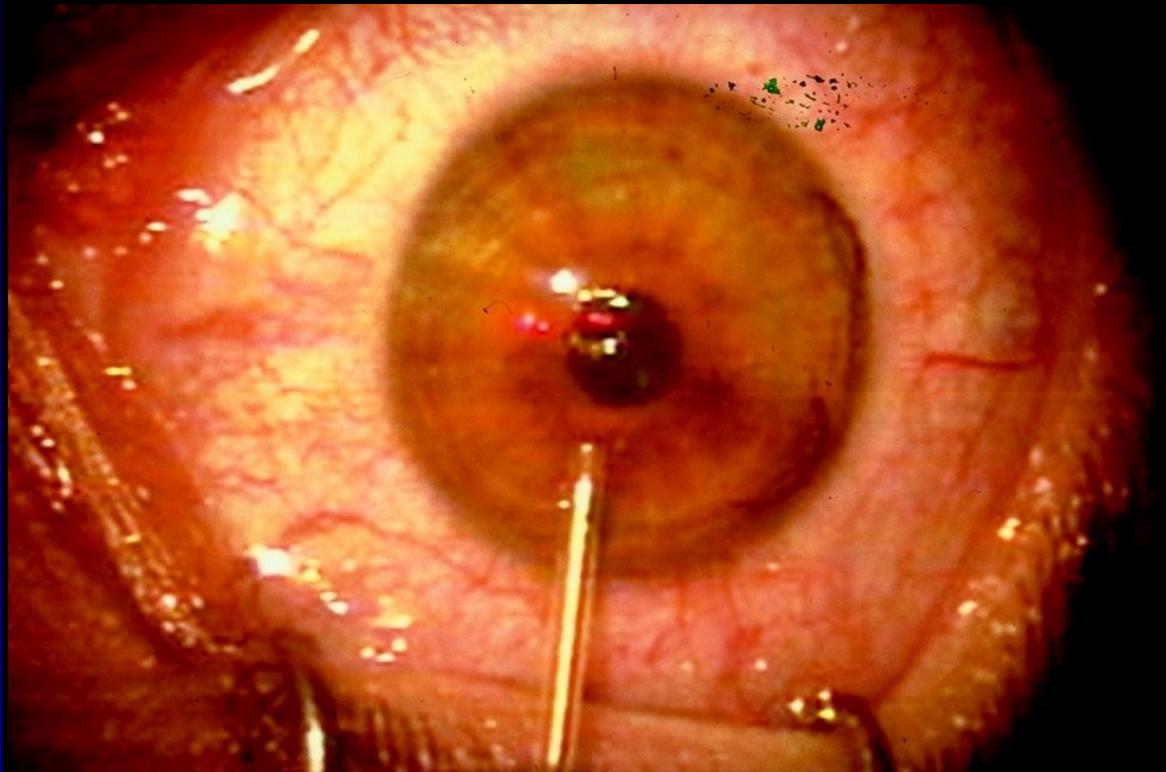


The flap is pulled back nasally with non-toothed forceps

The stromal faces of the flap and the stromal bed are scraped



Removal of Epithelial Ingrowth

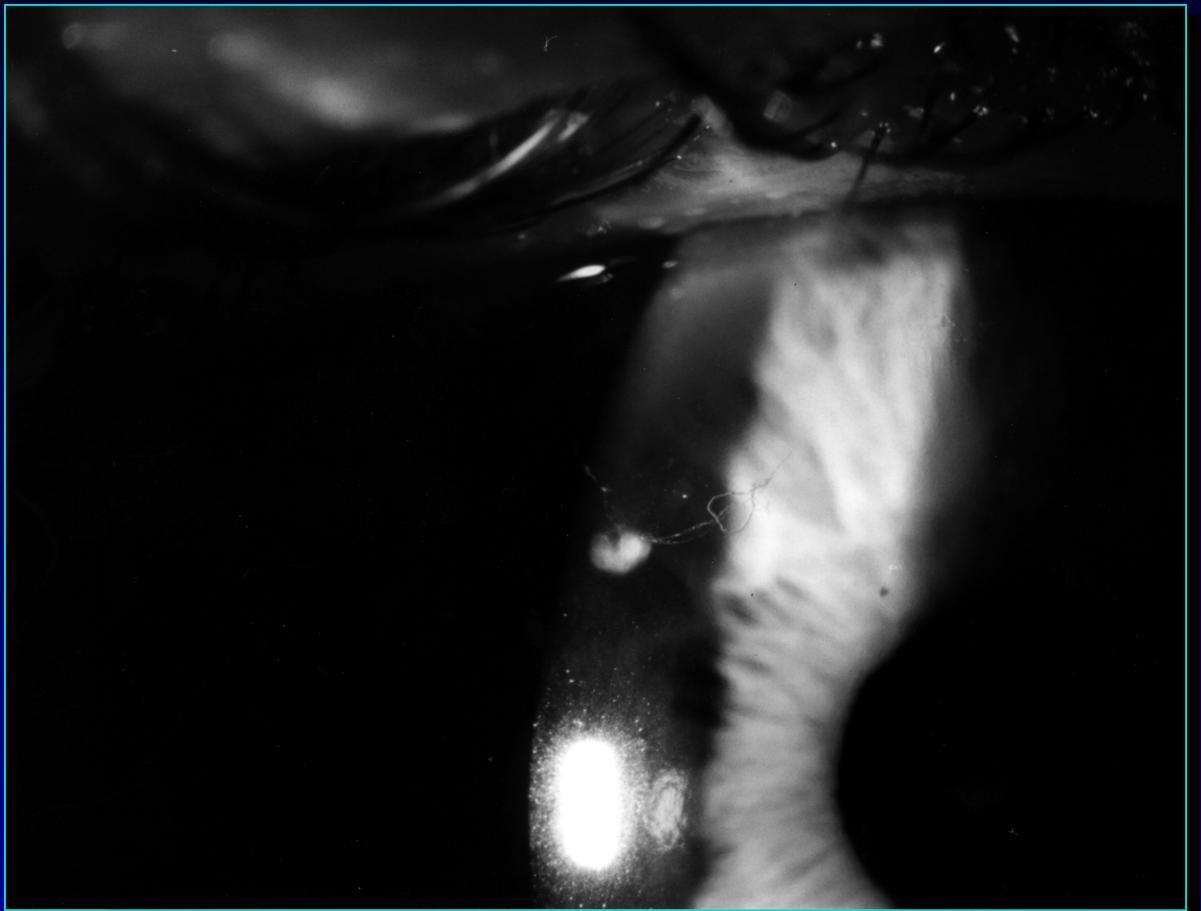


The stromal bed is irrigated to remove epithelial remnants or debris.

POSTOPERATIVE Complications of LASIK

INTERFACE DEBRIS

- Detected Immediately After Procedure
 - Lift Flap and Clean Interface
 - Refloat, Replace Flap
- Detected 1 Day Post Op
 - Carefully Observe
 - 99% of No Consequence
 - Infiltrate or Melt Extremely Rare (Lift and Vigorously Clean)



POSTOPERATIVE Complications of LASIK

INTERFACE DEBRIS

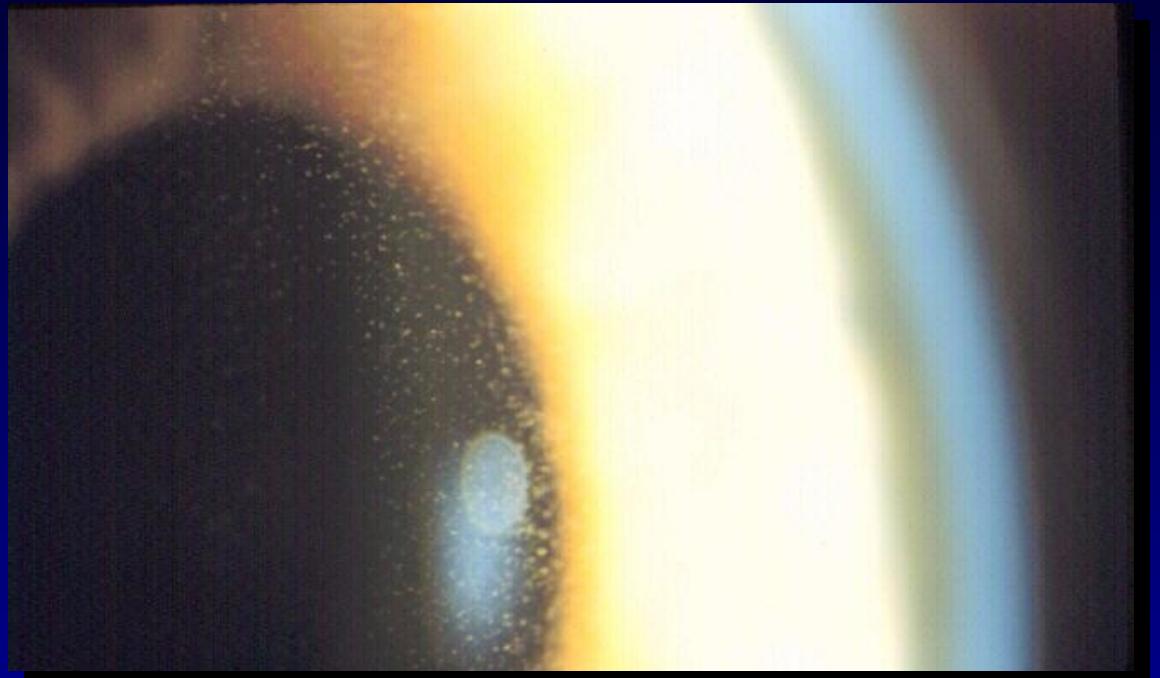
Diffuse
distribution of
talc particles in
the interface



POSTOPERATIVE Complications of LASIK

INTERFACE DEBRIS

Oil from a
microkeratome
coating stromal
interface



POSTOPERATIVE Complications of LASIK

INTERFACE DEBRIS

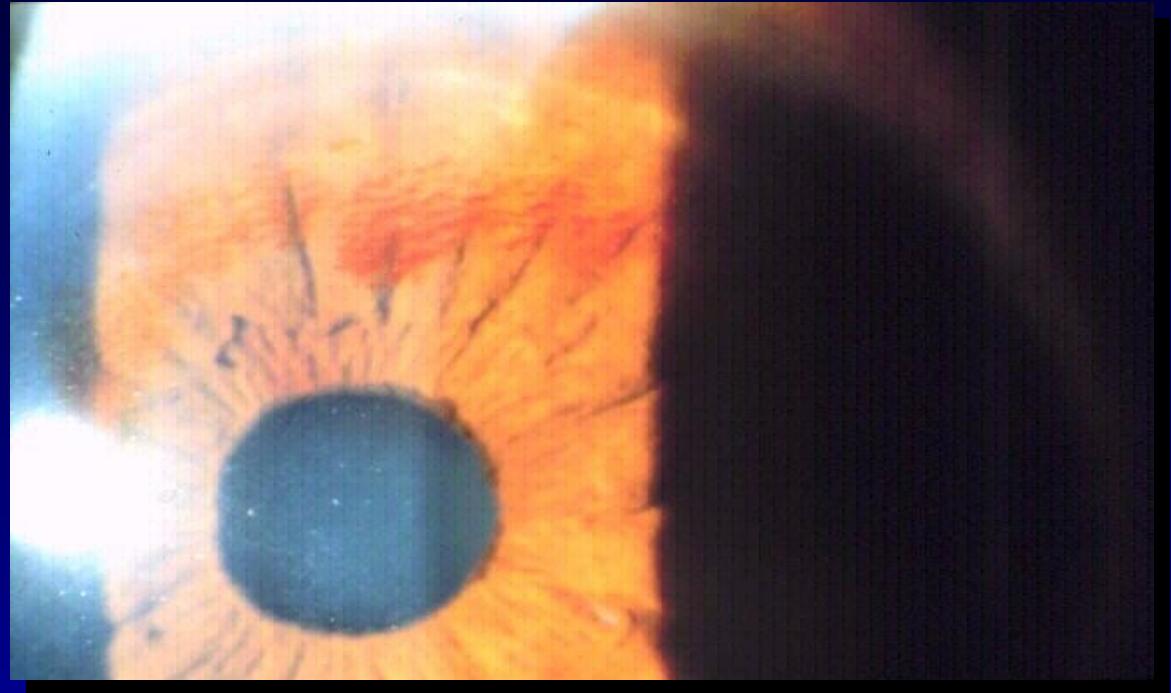
Appearance of
the interface
after instrument
milk used on a
microkeratome



POSTOPERATIVE Complications of LASIK

INTERFACE DEBRIS

Red blood cells
layered in the
lamellar
interface at 24
hour exam



Diffuse Lamellar Keratitis (DLK)

- Sands of Sahara (SoS)
- Non-specific Diffuse Intralamellar Keratitis (NSDIK)
- An early post-operative condition marked by the development of interface haze following LASIK

Diffuse Lamellar Keratitis (DLK)

- ONSET: day 1-2 post-op
up to 1 week post-op
- A significant drop in BCVA is possible
- Can develop moderate hyperopia

Diffuse Lamellar Keratitis (DLK)

- sifted sand-like appearance
- swirl-like pattern
- coalesced or diffuse
- easily mistaken as ‘SPK’; careful inspection reveals at level of the interface
- typically more dense centrally
- can be sectorial
- can be only peripheral

SANDS OF THE SAHARA

- Etiology - Unclear
- Scrapings reveal neutrophils (PMN's) but no bacteria
- Acute reaction thought to be related to some unknown antigens

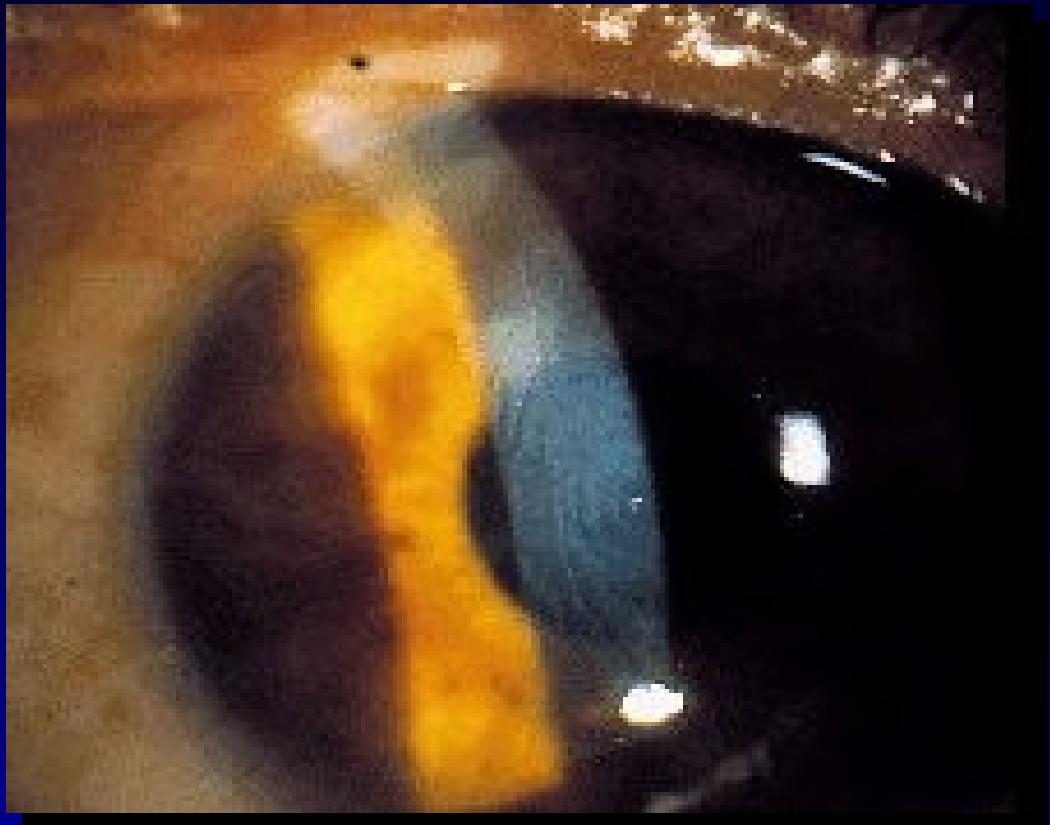
SANDS OF THE SAHARA

- POSSIBLE ANTIGENS:
 - Blood from neovascular vessels
 - Various drops
 - Microkeratome cleaning agents
 - Various bacterial toxins
 - Latex from surgical gloves
 - BSS
 - Irrigation cannulas

Sands of the Sahara

Diffuse Interlamellar Keratitis

White cells
delineating the
ablation steps &
chatter marks of
the microkeratome



DLK Grading System

GRADE I

- very mild
- usually resolves spontaneously over a month
- VA not affected.



DLK

Grade 1



Stage 1

DLK Grading System

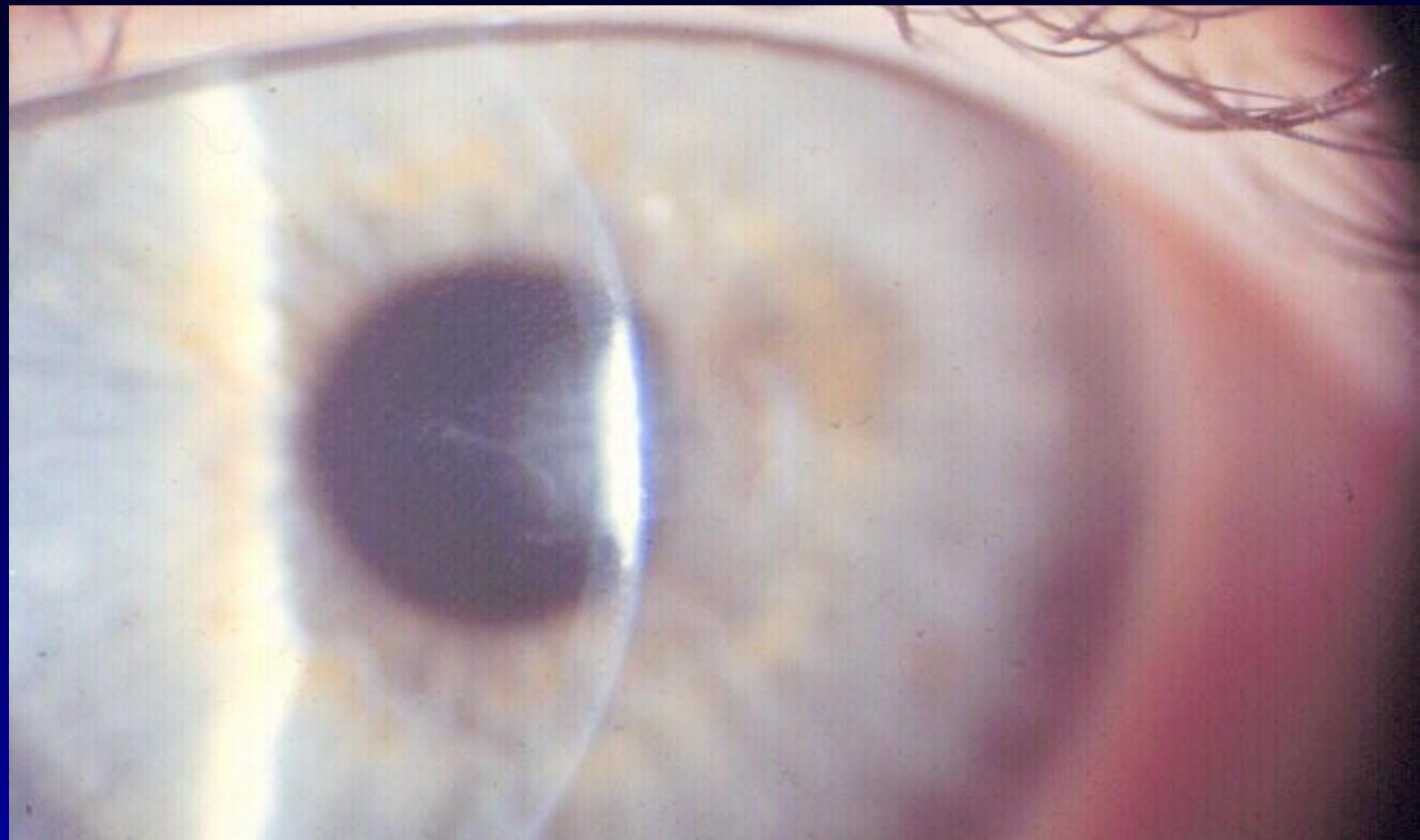
GRADE II

- more diffuse comparable to mild-moderate PRK haze
- VA decreased 1-2 lines.



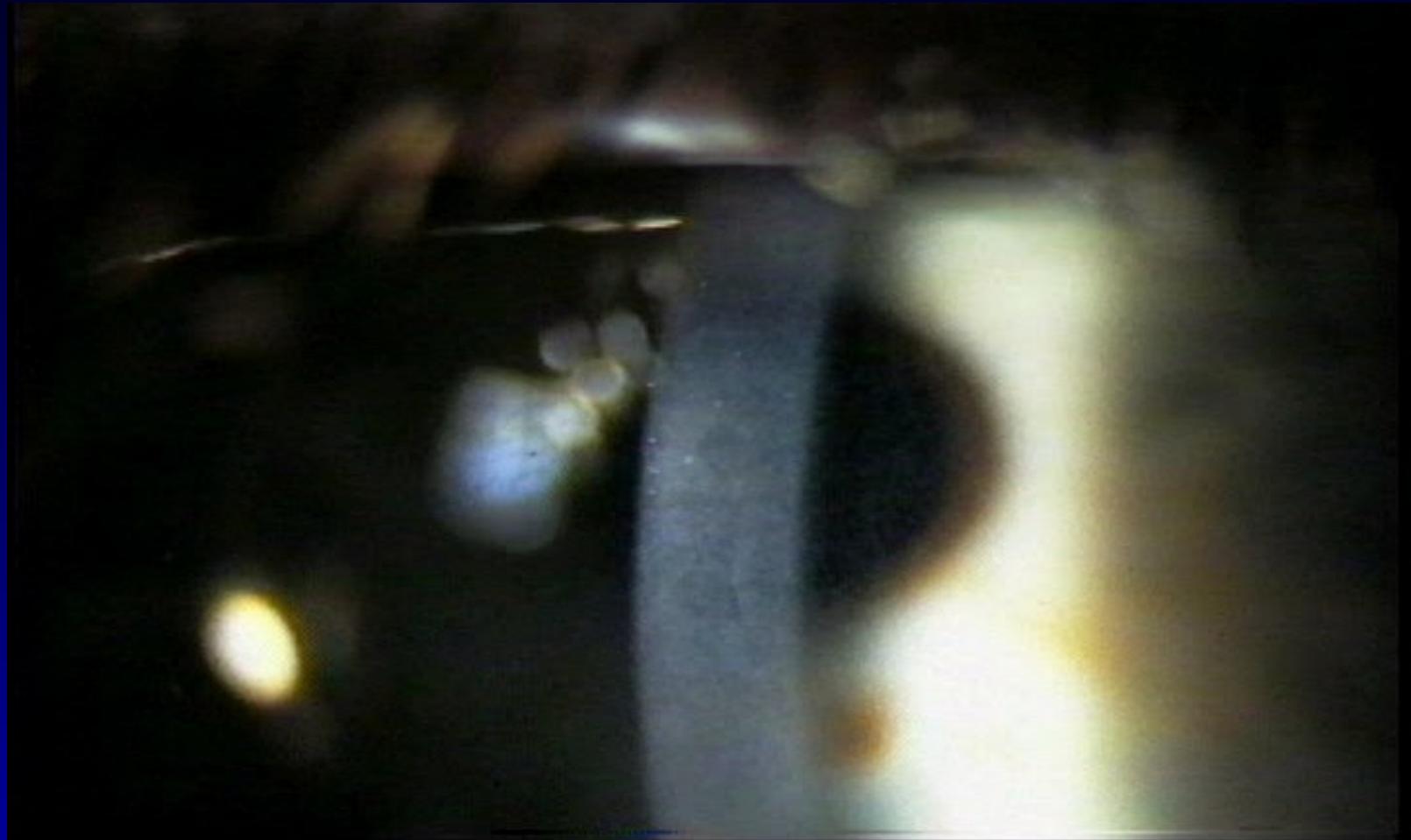
Sands of the Sahara

Grade II



Sands of the Sahara

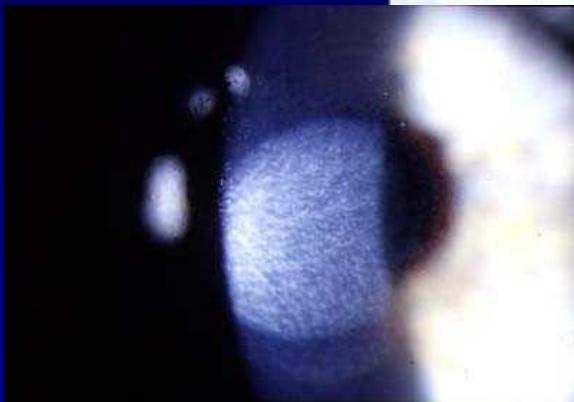
Grade II



DLK Grading System

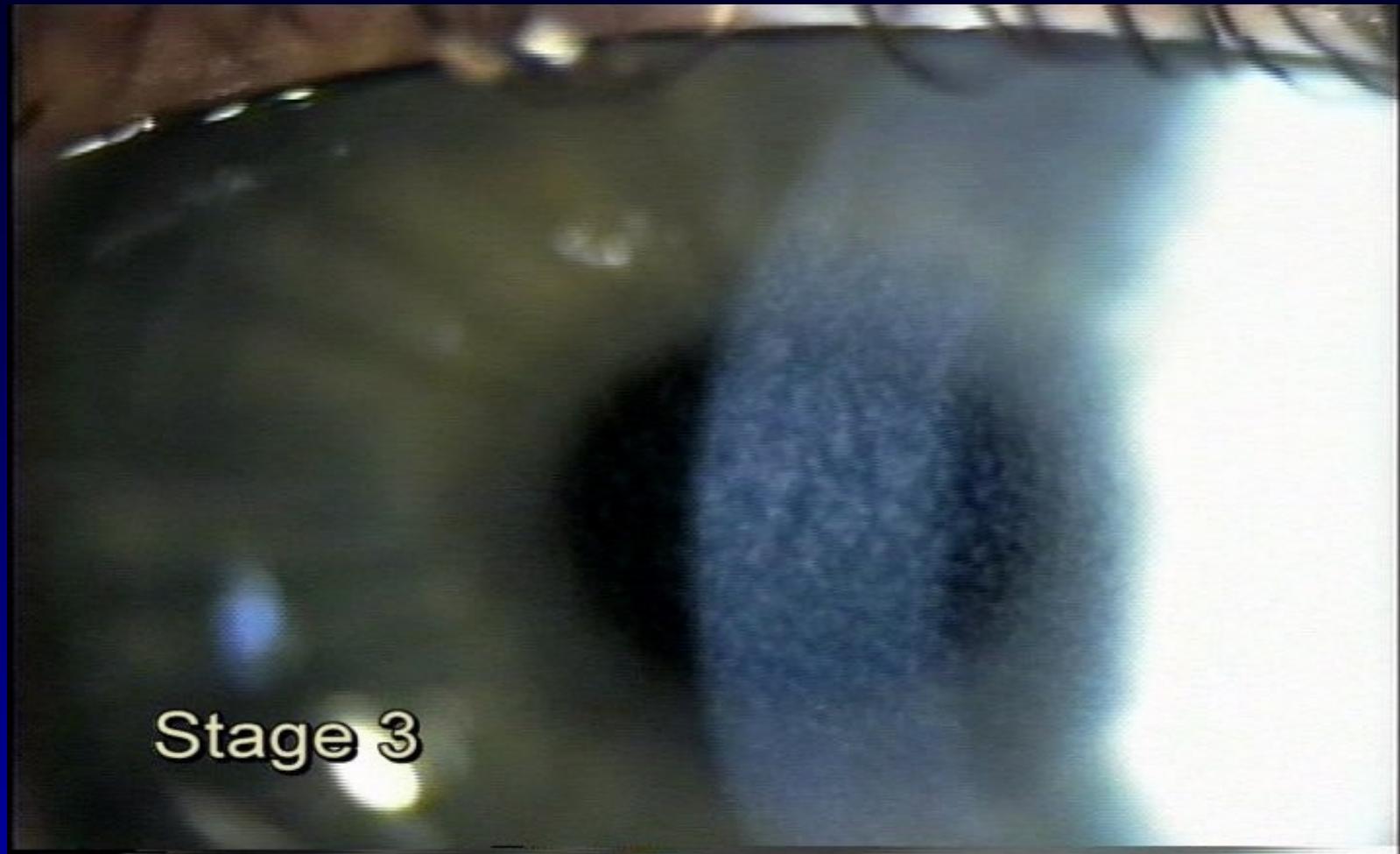
GRADE III

- SEVERE, may be confused for active stromal infection or grade IV PRK haze
- VA decreased significantly
- moderate to high hyperopic shift



Sands of the Sahara

Grade III



Stage 3

DLK

- TREATMENT FOR SEVERE DLK
 - high dose steroids for 1-2 weeks
 - flap lifted and interface cleaned
 - careful wipe with Merocel sponge or spatula
 - 5 microns of PTK applied
 - hourly topical steroids applied immediately post-op

DLK

- SUMMARY
 - An immune based reaction which is very steroid responsive but of unknown etiology
 - Early recognition and proper management is essential to achieving good visual prognosis

POSTOP Complications of LASIK

INFECTION

- Extremely Rare (1:5,000)
- Treat Aggressively
 - Culture
 - Topical Fortified Antibiotics
 - › Fluroquinolones / Aminoglycosides
- Retract/Remove Flap if Not Responding
- Prevent Endophthalmitis

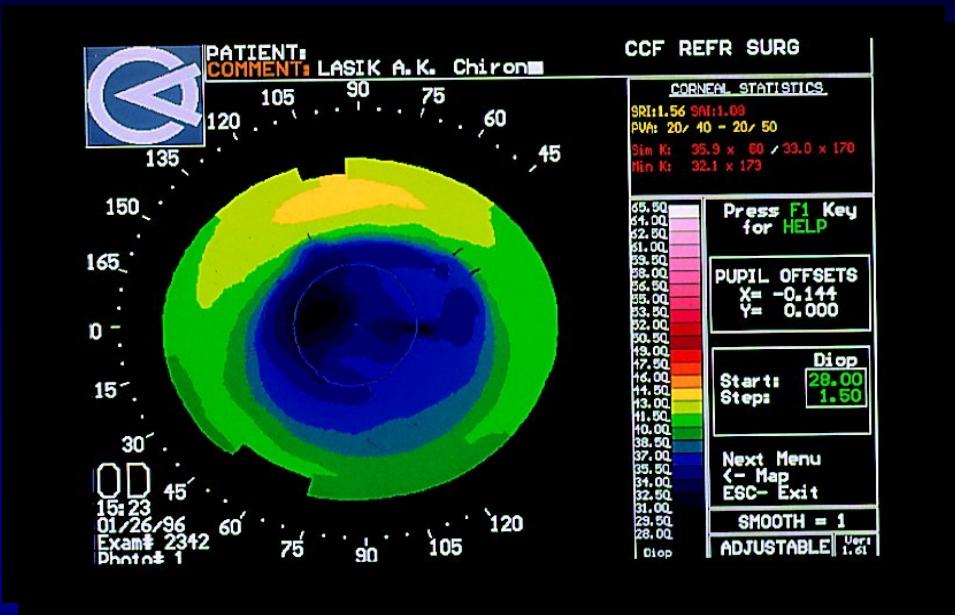
REFRACTIVE Complications of LASIK

DECENTRATION OF ABLATION

- ReTreat - Topography Guided Software
 - Chiron Technolas 217; CIPTA LaserSight
 - Summit Custom Disc
 - Wavefront Directed AUTONOMOUS;
WAVELIGHT
- Arcuate Incisions on Opposite Side (Pallikaris)

Decentered Ablation

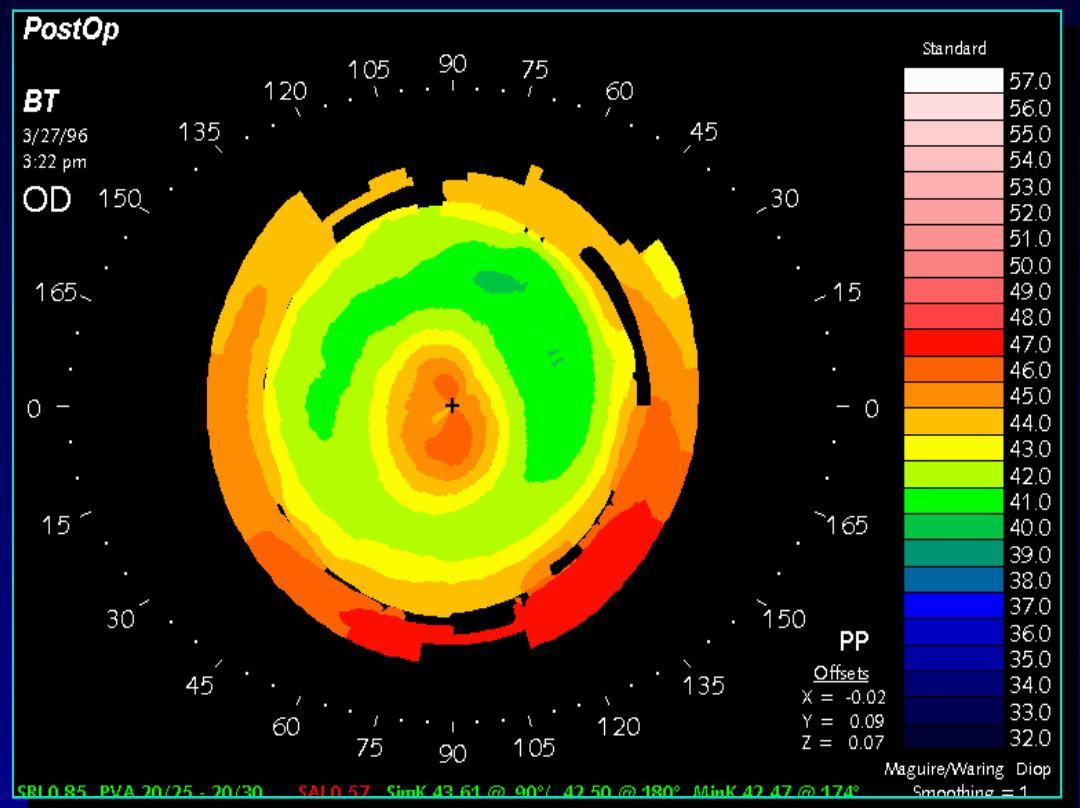
- Decentration of the ablation relative to the entrance pupil. The patient complained of a ghost image seen with this eye despite 20/20 corrected vision



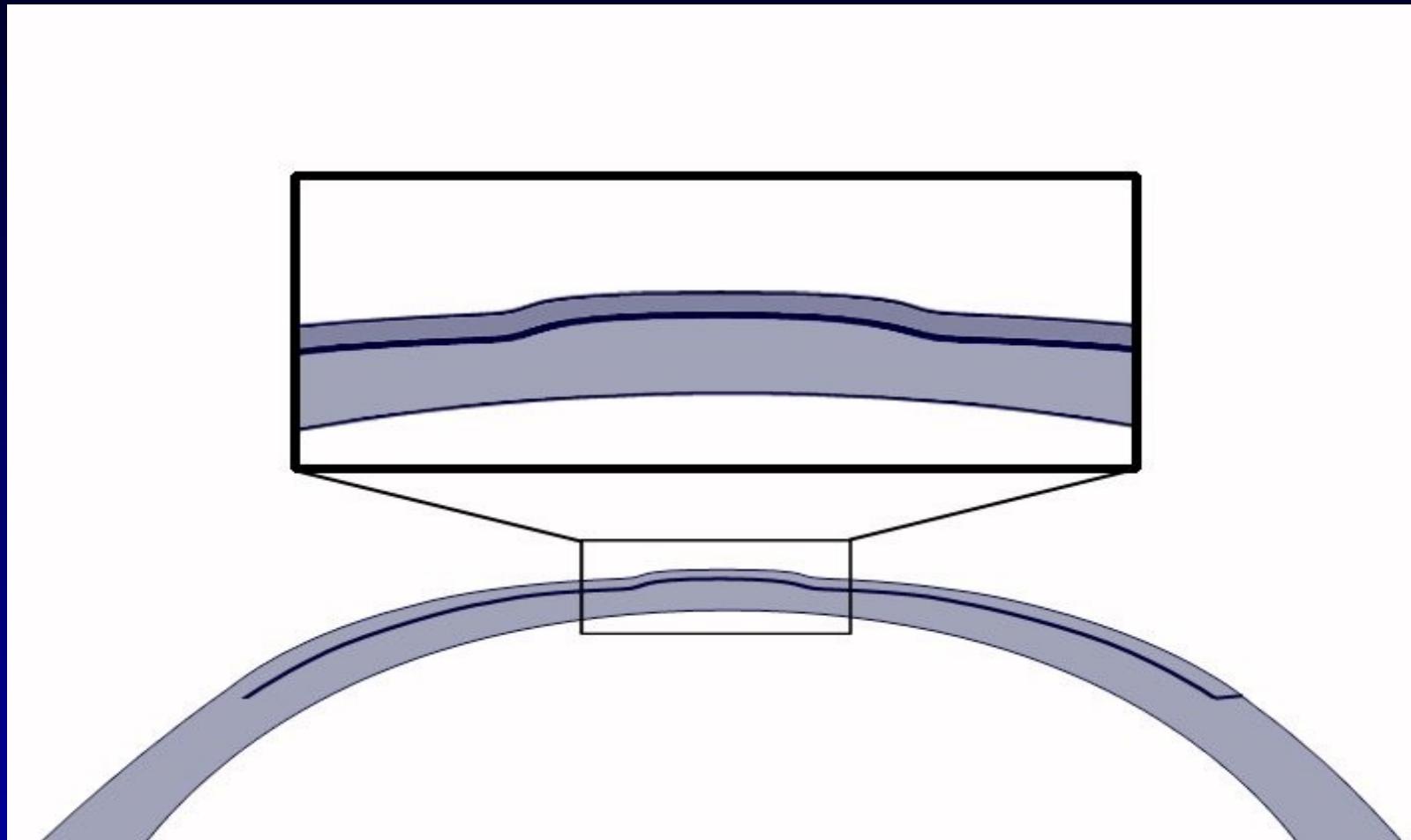
REFRACTIVE Complications of LASIK

CENTRAL ISLANDS

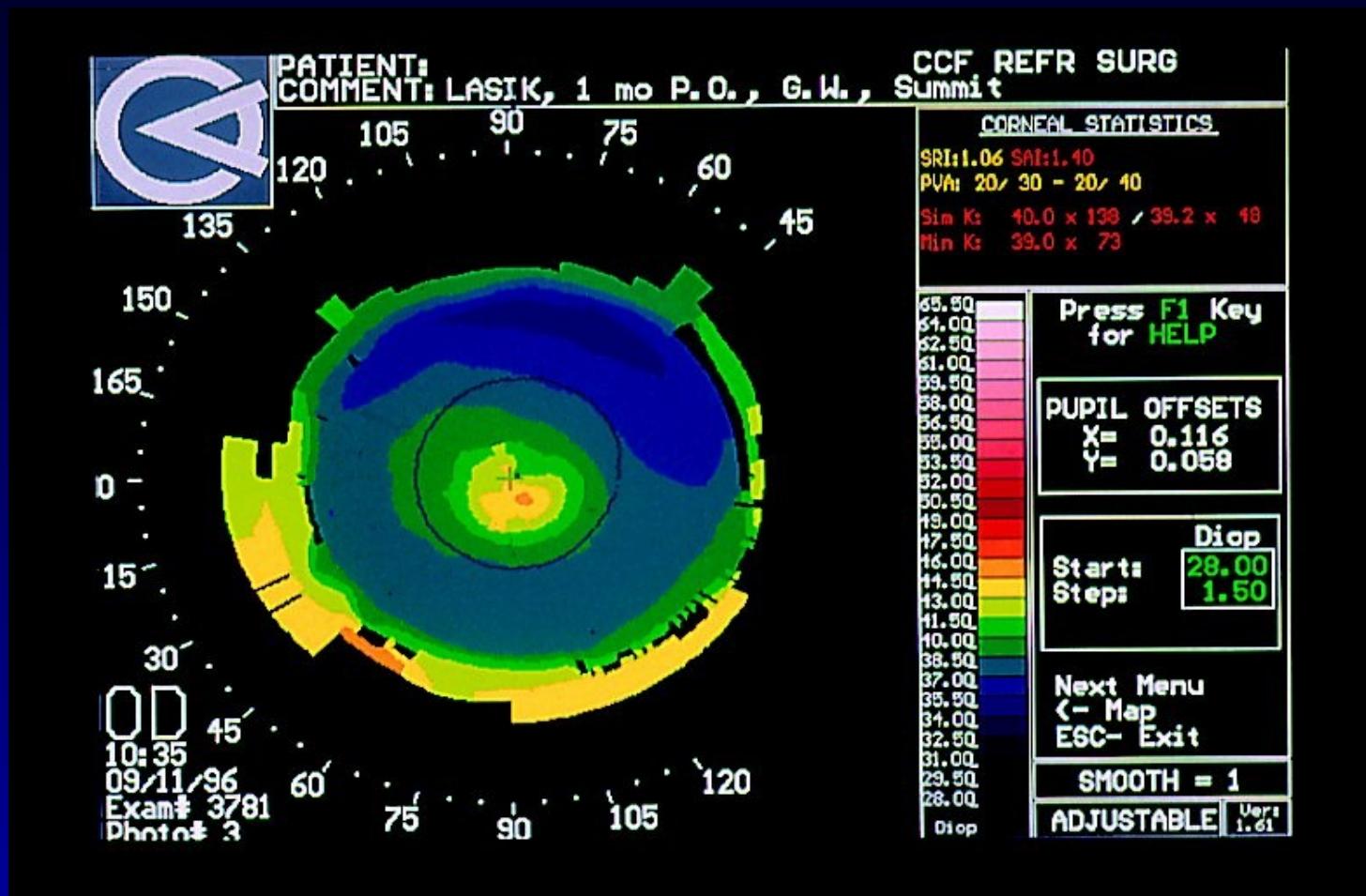
- Largely Preventable with PreTx Software
- Observe
 - May Regress
 - No Tx (Patient Minimal Complaints)
 - Caro Island Masher
- Lift Flap and ReAblate
 - Use Appropriate Optical Zone and
 - Diopter for PRK Excimer Ablation



Central Islands



Central Islands



REFRACTIVE Complications of LASIK

HALOES AND GLARE

- Uncommon with LASIK
- Avoid Large Pupils
 - Diameter > Treatment Zone
(Dim Light Conditions) PUPILOMETER
 - Avoid Extremely High Corrections
 - Preoperative Patient Counseling
- PostOp Miotics if Present & Continues
- New Custom Ablations Topo, Wavefront
- Bilateral Treatment, Cortical integration

REFRACTIVE Complications of LASIK

UNDERCORRECTION

- Try to Prevent with
 - Careful Serial Refractions
 - Adequate CL Discontinuation
 - Serial Topography
- Early Detection (1 Month)
 - > 1 D - Lift Flap, Additional Ablation
- Detection After 2 Months
 - Lift and re-ablate to 4 months
 - Wait - ReCut and Reablate after 6 Months

REFRACTIVE Complications of LASIK

OVERCORRECTION

- Try to Prevent with
 - Careful Serial Refraction
 - Cycloplegic Refraction
 - Surgical Plan “Err on side of Undercorrection”
Especially Elderly
- Detected Early - Wait 6 Mo (may regress)
- Detected Late - ReTreat
 - Hyperopic LASIK
 - LTK REFRACTEC